

Claims

- [c1] An assembly apparatus for joining first and second members comprising:
a base including first and second independently extendible members;
a dispenser joined to a third independently extendible member, said third independently extendible member operatively connected to said base; and
wherein said first, second and third independently extendible members are actuated by a control system to position said dispenser relative to the first and second members.
- [c2] The apparatus of claim 1, wherein said control system is a pneumatic control system.
- [c3] The apparatus of claim 2, wherein said control system includes at least one inlet port for connecting the assembly apparatus to a source of compressed air.
- [c4] The apparatus of claim 3, wherein said control system includes at least one valve for selectively routing air between said inlet port and each of said first, second and third independently extendible members.

- [c5] The apparatus of claim 4, further including a pneumatic timer operatively connected to said valve.
- [c6] The apparatus of claim 2, wherein said first, second and third independently extendible members are pneumatic cylinders.
- [c7] The apparatus of claim 1, wherein said first and second independently extendible members are generally extendible along a first axis and said third independently extendible member is generally extendible along a second axis, said second axis being generally orthogonal to said first axis.
- [c8] The apparatus of claim 1, wherein said control system is a hydraulic control system.
- [c9] The apparatus of claim 1, wherein said second independently extendible member includes a mandril and, when said second independently extendible member is extended, said mandril is received by the first member to facilitate joining of the members.
- [c10] The apparatus of claim 1, further including assembly fixtures to receive the first and second members.
- [c11] The apparatus of claim 1, wherein said dispenser expels an adhesive upon a surface of one of the first or second

members.

[c12] A method of assembling first and second members comprising the steps of:

providing an apparatus that includes a first independently extendible member, a second independently extendible member, a third independently extendible member and a dispenser operatively connected to the third independently extendible member;

inserting the first and second members into assembly fixtures;

extending the first independently extendible member to orient the dispenser about the first member;

dispensing an adhesive from the dispenser upon an outer surface of the first member;

retracting the third independently extendible member to align the first and second members;

extending the second independently extendible member to join the first and second members; and

applying compression to the first and second members.

[c13] The method of claim 12, wherein the extending and retracting steps of the first, second and third independently extendible members are controlled by a pneumatic control system.

[c14] The method of claim 12, wherein the compressing step

is controlled by a pneumatic timer.

- [c15] The method of claim 12, wherein the step of extending the second independently extendible member includes inserting a mandril through the first member.
- [c16] The method of claim 12, wherein the steps of extending and retracting the first, second and third independently extendible members are controlled by a hydraulic control system.
- [c17] The method of claim 12, further including the step of retracting the first and second independently extendible members and extending the third independently extendible member to return the assembly apparatus to a home position.
- [c18] The method of claim 17, wherein compression applied to the first and second members is minimized before retracting the first and second independently extendible members.